City of Cambridge

Purchasing Department

Cynthia H. Griffin
Purchasing Agent

TO: ALL BIDDERS

FROM: CITY OF CAMBRIDGE

DATE: OCTOBER 18, 2011

RE: P25 RADIO SITE ROOM RENOVATIONS AT 700 HURON AVENUE
FILE NO. 5611

The following questions were received regarding the above referenced bid:

Question:
1. What was the size of the electrical service that needs to be provided?

Answer:
200 amp service.

Question:
2. Can we provide a cut sheet on the 800 antennas that we are providing?

Answer:
The 800 antenna is the Bird CC807-06.

Question:
3. Can we provide a cut sheet on the TTA (Tower Top Amplifier) that we are providing?

Answer:
Attached.

Question:
4. Can we provide the spec on the 2 UHF antennas?

Answer:
Antel BCD-4506-EDIN-X.

Question:
5. Can we provide the location of the antennas?

Answer:
Attached.

Question:
6. Will the bid be postponed?

Answer:
Yes, one week.

Question:
7. The Table of contents references "00900 Technical Specifications – pages 00900-01-00900-21 that were not included in our bid package.

Answer:
Attached.

Question:
8. Section 5 states that a Contractor's Certification form, Sub-bidder's Certification Form, and an OSHA Certification Form are required, but they were not provided. Are they required for this Bid?

Answer:
The only Form required is the OSHA Certification Form and that is attached in the Addendum.

Question:
9. Section 8.8 of the General Terms and Conditions requires a separate Owner's Protective liability policy; will this be required for this project?

Answer:
No.

Question:
10. Section 8.8-8.9 of the General Terms and Conditions states that the Excess Umbrella Liability requirement is $15 Million. This is high for a project valued at $75,000.00. Section 8.10 of the General Terms and Conditions which states that "the City reserves right, at its sole discretion to amend the insurance requirements contained herein"; does the City plan to waive the requirements for $15 Million Excess Umbrella coverage?

Answer:

Excess Umbrella Liability – Combined Single limit $1 Million and General aggregate $ Million.

All other particulars remain unchanged.

CYNTHIA H. GRIFFIN
PURCHASING AGENT

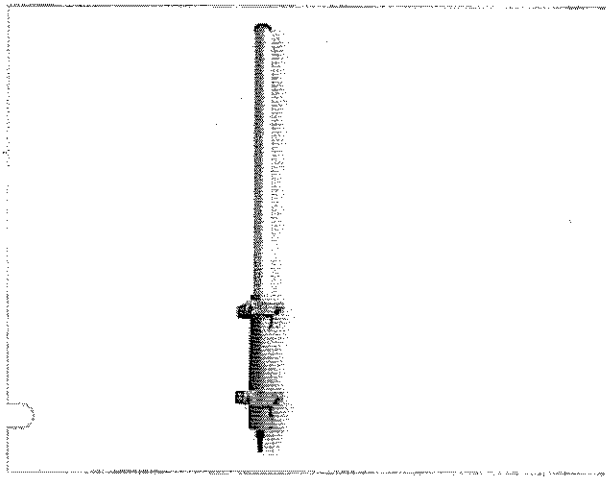
ADDENDUM NO. 2

Bird® Omnidirectional Collinear

CC807-06

(Motorola # DSCC80706)

Bird Technologies Group, TX RX Systems brand, offers a Corporate Collinear Antenna that is PIM and PIP rated. The true corporate feed of these arrays maintains total pattern integrity over a very broad operating bandwidth. This is now achieved in the preferred form factor of a fully enclosed fiberglass radome.



PROBLEM	SOLUTION
Bandwidth needed	Extraordinary bandwidth characteristics with superior pattern control over an extended band coverage
PIM Concerns	Industry leading PIM specifications maintained over the service life of the antenna
PIP Concerns	PIP Rated ensuring compatability with Multi Channel Transmitter applications employing newer digital modulation schemes
Antenna Orientation	Invertible in the field to suit all applications

APPLICATIONS

These high gain collinear arrays allow site operators to combine, with complete integrity, a large number of communications services into a single, low profile collinear antenna array.

Bird® Omnidirectional Collinear

CC807-06
(Motorola # DSCC80706)

Specifications, Electrical

Model Number	CC807-06
Nominal Gain dBi (dBd)	7.7 (5.5)
Frequency (MHz)	746-870
Tuned Bandwidth	Full
VSWR	1.5:1
Nominal Impedance (ohms)	50
Vertical Beamwidth (degrees)	17
Horizontal Beamwidth (degrees)	360
Power (W)*	500
Passive IM 3rd order (dBc)**	-150
Peak Instantaneous Power (kW)	25

*This is a continuous power rating based on internal temperatures stabilizing at no greater than 50° Celsius above ambient.
**Referenced to 2 x 20W carriers.

Specifications, Mechanical

Construction & Configuration	Composite fiberglass with sky blue radome, aluminum mounting tube
Length (inches)	72
Radome Diameter (inches)	3
Weight (lbs)	16
Shipping Weight (lbs)	45
Shipping Dimensions (inches)	6 (H) x 6 (W) x 79 (L)
Termination	7/16" DIN female flange mount
Mounting Area (inches)	20 x 3.5 diam. Aluminum
Suggested Clamps (not included)	91-00-111
Invertible Mounting	Yes
Projected Area (ft²)	1.4 (no ice) 1.8 (with ice)
Lateral thrust @ 100 (mph)	36
Wind Gust Rating	>150 (no ice) >150 (with ice)
Torque @ 100 (ft-lbs)	54

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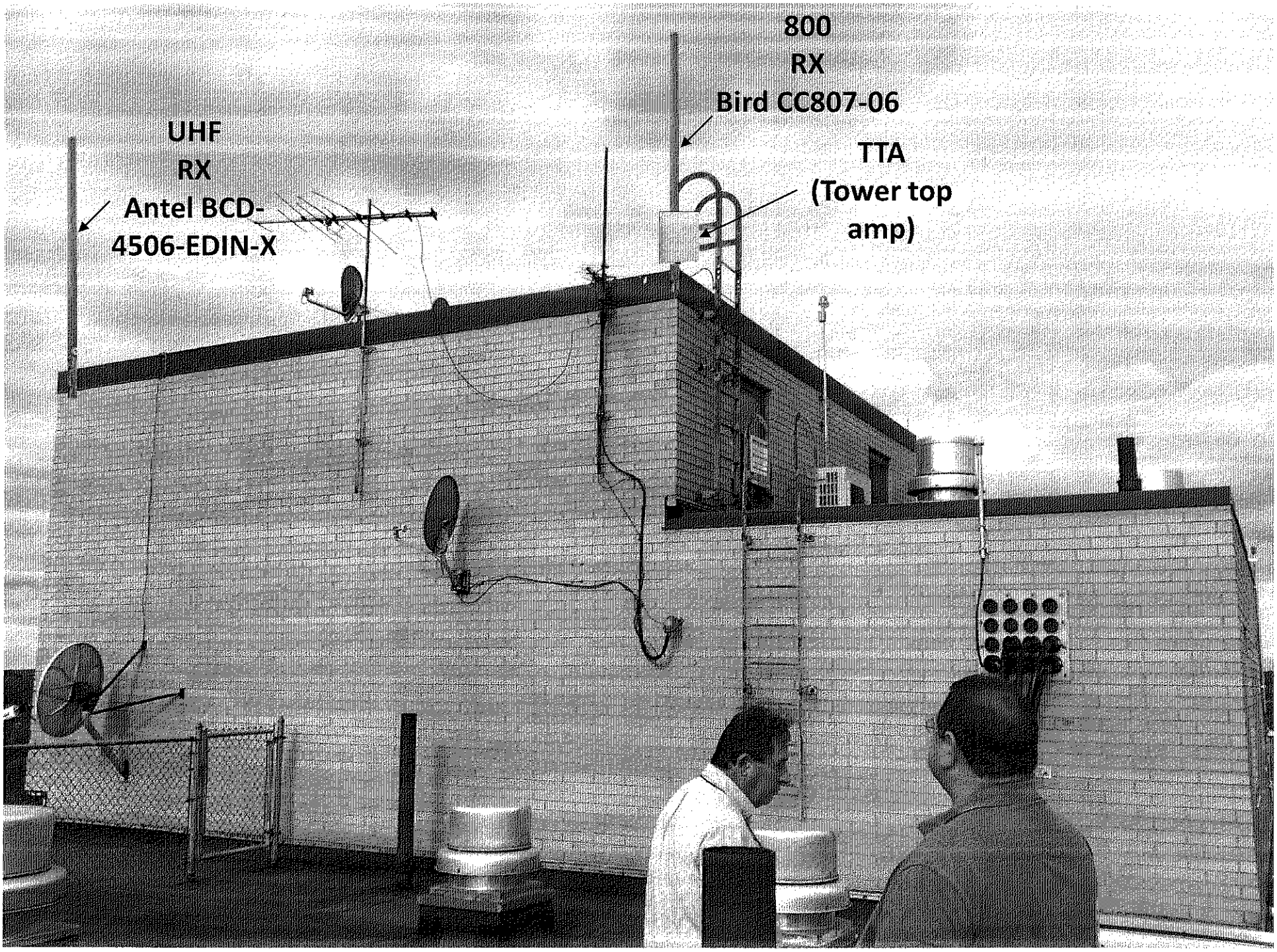
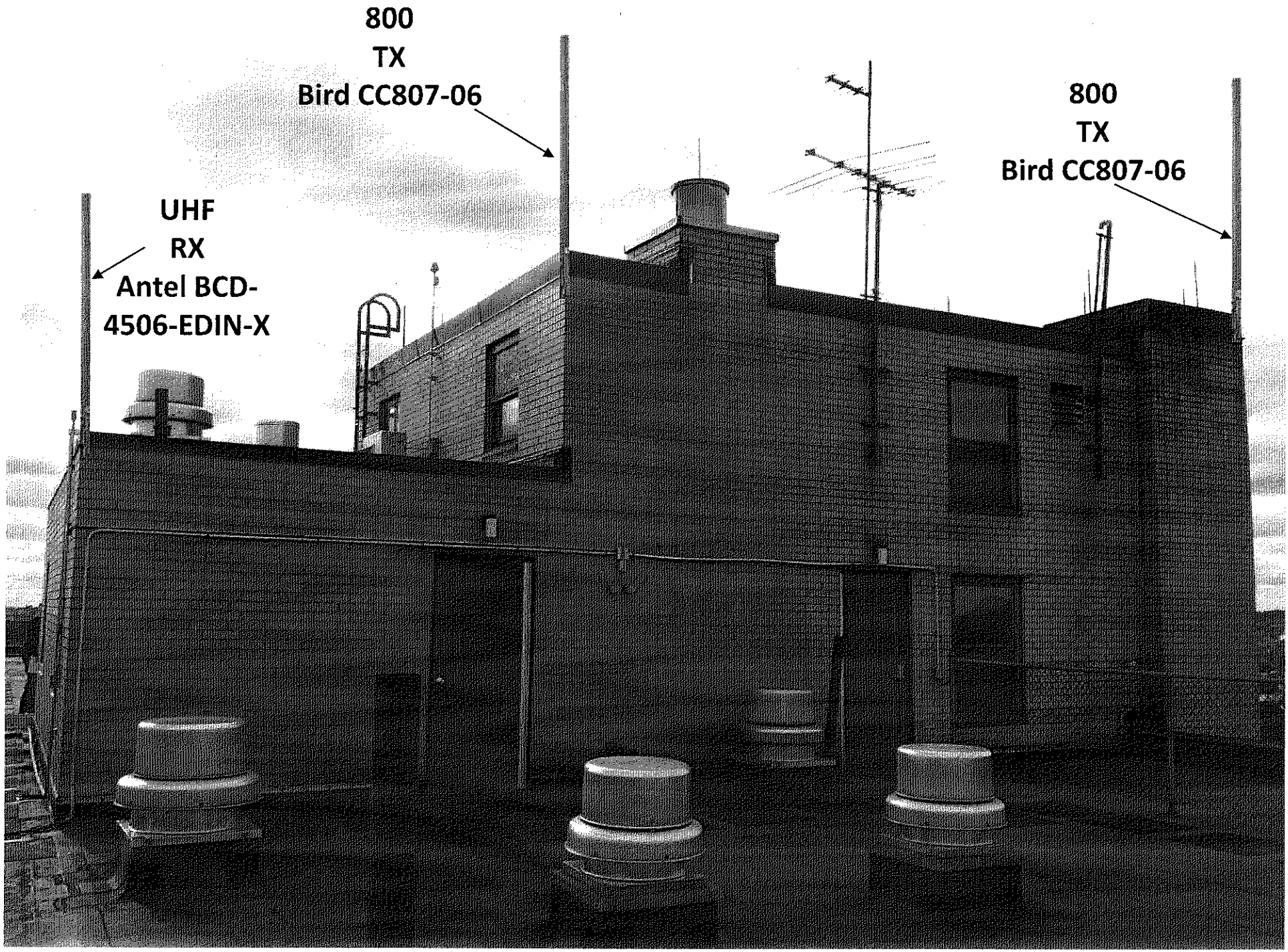

800
RX
Bird CC807-06
UHF
RX
Antel BCD-
4506-EDIN-X
TTA
(Tower top
amp)


800
TX
Bird CC807-06
800
TX
Bird CC807-06
UHF
RX
Antel BCD-
4506-EDIN-X

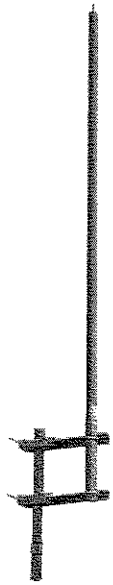
Amphenol ANTENNA SOLUTIONS

BCD-4506-EDIN-X

V-Pol | Omni | 360° | 6.0 dBd

Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

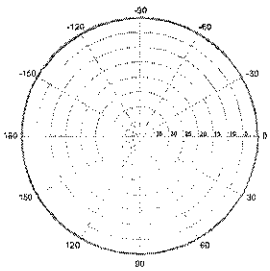


Electrical Characteristics	
Frequency bands	450-500 MHz
Polarization	Vertical
Horizontal beamwidth	360°
Vertical beamwidth	15°
Gain	6.0 dBd (8.1 dBi)
Electrical downtilt (X)	0
Impedance	50Ω
VSWR	≤ 1.5:1
Null fill	0%
Input power	500 W
Lightning protection	Direct Ground
Connector(s)	1 / NE or EDIN / Female / Bottom

Mechanical Characteristics		
Dimensions Length x Diameter	3390 x 65 mm	133.5 x 2.6 in
Weight without mounting brackets	12 kg	26 lbs
Survival wind speed	> 201 km/h	> 125 mph

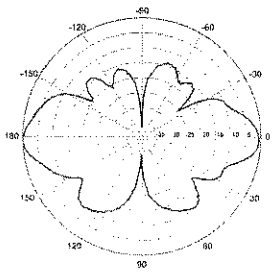
Mounting Options	Part Number	Fits Pipe Diameter	Weight
Standard Mounting Bracket Kit	36312000	50-160 mm (2.0-6.3 in)	8.2 kg (18 lbs)
Offset Mounting Bracket Kit	36413001	50-160 mm (2.0-6.3 in)	7.7 kg (17 lbs)
Downtilt Bracket Kit	Antenna cannot be mechanically downtilted		
Inverted Mounting	The BCD-4506-EDIN-X cannot be mounted in an inverted position		
Inverted Models	The inverted model is sold under a different part number: BCD-4506-EDIN-X-Invert		

BCD-4506-EDIN-X



Horizontal

BCD-4506-EDIN-0



0° | Vertical

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

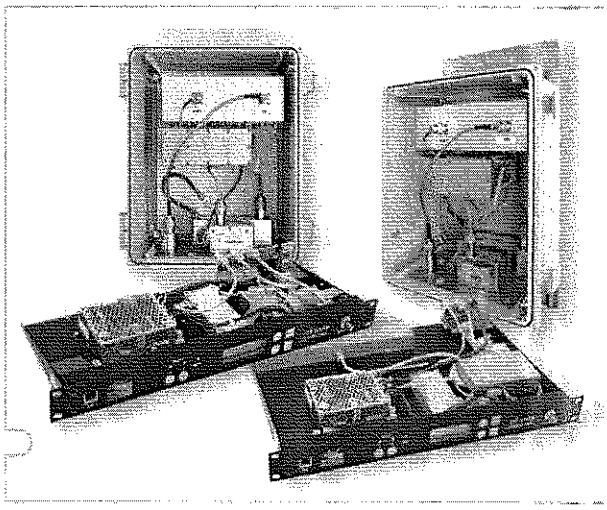
Bird® Compact AutoQuad™ Tower Top Amplifier System

428B-83H-01
(Motorola # DS428B83H01)

Bird Technologies Group, TX RX Systems brand, Auto Quad Tower-Top Amplifier (TTA) system is a high performance, quadrature-coupled low noise amplifier (LNA).

The TTA operates independently, monitoring LNA current and automatically switching to a redundant LNA in the rare event of failure. Status reporting is accomplished via AISG compliant telemetry between the controlling processor in the TTA and the base muliticoupler control unit. The base multicoupler control unit has an on board AISG modem device which does not require the use of an external data cable. This telemetry does not interfere with RF Signals in any way and communicates the LNA currents, temperature and operational status to the base muliticoupler control unit LCD display. Test modes and manual switching between LNA's is also accomplished by way of the telemetry system.

The TTA consists of two components: the tower top amplifier mounted close to the antenna and the control management unit (CMU) with or without the receiver multicoupler. In order to reduce the size of the TTA and simultaneously provide 120 dB of isolation of a TX carrier, filtering has been split between the TTA and the base unit.



PROBLEM	SOLUTION
Reliability	All tower top ports protected by internal surge supressors
Fault Detection	Two independent Quad LNA's in the tower top
System Testing	Microprocessors continuously monitor amplifiers and will switch tower top LNA's when fault detected. At a glance status reporting and form-C contacts switching when alarm detected

Applications

The TTA is designed to increase the performance of a Base Transceiver Station (BTS) while ensuring reliable communications for critical Public Safety applications.

This increase in sensitivity can make up for the imbalance between mobile and handheld users in critical systems.

The TTA is used when cable losses exceeds 1.5 dB

Bird® Compact AutoQuad™ Tower Top Amplifier System

428B-83H-01
(Motorola # DS428B83H01)

Specifications, System
13 dB reserve gain and maximum 6 dB transmission line loss assumed

Bandwidth	792-824 MHz
System Noise Figure (calculated)	3.5 dB Max
3rd Order IIP	› 15 dBm
Reserve Gain	Fully settable by electronic attenuator
Rejection	‹110 dB min. 120dB nominal at 776 and 851 MHz
Net Weight	29 lbs for TTA + MCU

Description, Product

TTA, Compact AutoQuad, 792-824 MHz, tower top box only	428B-83H-01-T
Multicoupler control unit (MCU) 16-port, 792-824 MHz, to be used in conjunction with 428B-83H-01-T	428B-83H-01-M-110*
Control and Monitoring Unit (CMU) for TTA, w/o RX Multicoupler, 792-824 MHz, to be used in conjunction with 428B-83H-01-T, for GTR-8000 radio	428B-83H-01-C-10*

*The base deck are designed for AC power. For 48 VDC version, add "-48" at the end of the model number, i.e. 428B-83H-01-M-48 and etc.

Specifications, Tower Top Amplifier

Frequency Range	792-824 MHz
Net Gain	23 dB Typ
Noise Figure: (Typ./Max)	2.7 dB (Typ.)
Backup Amplifier Switching	Solid State RF Switch
Integrated Test Port Isolation	33.5 (Typ.)
Preselector Type	7-pole TEM bandpass with cross-coupling
Loss	‹0.8 dB (Typ.)
Rejecton	›60 dB @ 776 and 851 MHz
LNA Type	2-stage Quadrature integrated into filter
Gain	26 dB (Typ.)
Noise Figure	1.2 dB (Typ.)
3rd Order Input IP	+18 dBm (Typ.)
Impedance	50 ohms
Antenna Port VSWR	2:1
Power Requirements	12 VDC @ 1.25 A
Lightning Protection	Impulse suppressor on all external connectors
Lightning Arrester on main Transmission Lines (DC Voltage Pass Through) (Customer Supplied)	Motorola Part Number DS1090501WA (Male/Female) Motorola Part Number DS1090501WB (Female/Female)
Lightning Arrester on Test Port Line (DC Voltage Pass Through) (Customer Supplied)	Motorola Part Number DS1090501WA (Male/Female) Motorola Part Number DS1090501WB (Female/Female)
Operating Temp. Range	-30°C to +60°C**
Enclosure	Modified NEMA 4X (Weather Resistant)
Connectors	N-Female
Dimensions (HWD): not including mounting tabs or connectors	18" x 6" x 6" (457 x 152 x 152 mm)
Net Weight	17.5 lbs

Optional Products

Motorola best practices recommends the use of optional filters with narrower windows in order to achieve better selectivity for the system and provide more protection to the receivers against interference. Please specify sub-band frequency when ordering.

89-83F-02-03	792-806 MHz, 3 MHz Bandwidth Preselector
89-83F-02-06	792-806 MHz, 6 MHz Bandwidth Preselector
89-83F-02-09	792-806 MHz, 9 MHz Bandwidth Preselector
89-83F-02-14	792-806 MHz, 14 MHz Bandwidth Preselector
89-86A-02-03	806-824 MHz, 3 MHz Bandwidth Preselector
89-86A-02-05	806-824 MHz, 5 MHz Bandwidth Preselector
89-86A-02-10	806-824 MHz, 10 MHz Bandwidth Preselector
89-86A-02-15	806-824 MHz, 15 MHz Bandwidth Preselector
89-86A-02-18	806-824 MHz, 18 MHz Bandwidth Preselector
75-83H-428B	16-port Multicoupler Expansion Kit (for 32 total ports)

Specifications, Multicoupler Control Unit (MCU)

Frequency Range	792-824 MHz
Multicoupler Net Gain	+1 dB Typ; 0 dB min
Distribution Amp Type	Quadrature-Coupled Dual Stage
Gain	23 dB
Noise Figure	4 dB
1 dB Compression Point	+27 dBm
3rd Order Output IP	+46 dBm
Number of outputs/Split Loss	16 or 32 / 18 dB
Impedance	50 ohms
VSWR	‹ 2:1
Connectors: To TTA	N - female
Connectors: To BTS	BNC-female for - M model; N-female for -CS and -CG models
Test Port Input	BNC - female
Reserve Gain Electronic Attenuator	0-15.5 dB in 0.5 dB steps
Distribution Amp Electronic Attenuator	0~3 dB in 0.5 dB steps
Alarm Contacts	Two Form C Contacts (Nominal 2A @ 30 VDC or 0.5A @ 125 VAC)
I/O	Ethernet
Power Requirements	90-240 VAC 50/60 Hz 180 mA @ 120 V (current draw is for base deck only, not including the power needed to run the tower top box)
Operating Temperature Range at non-condensing humidity	0°C to +50°C
Enclosure	Standard EIA 19" Rack Mounting
Dimensions (HWD)	*1 RU x 19" x 14" (38 x 483 x 356 mm)*
Net Weight	11.5 lbs

** Tower Top Amplifier will function up to 70°C without shutting down however, the specifications are not guaranteed.

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Manual Number 7-9500-2

Design Guide for the 428B TTA System

8625 Industrial Parkway, Angola, NY 14006 Tel: 716-549-4700 Fax: 716-549-4772 sales@birdrf.com www.bird-technologies.com

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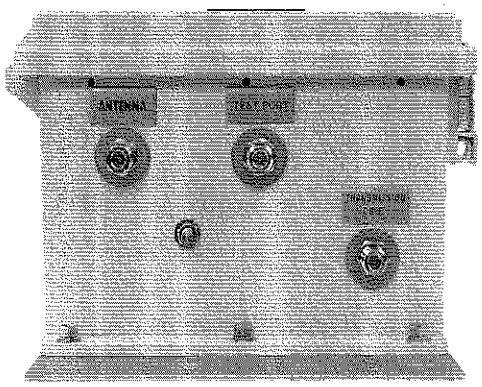
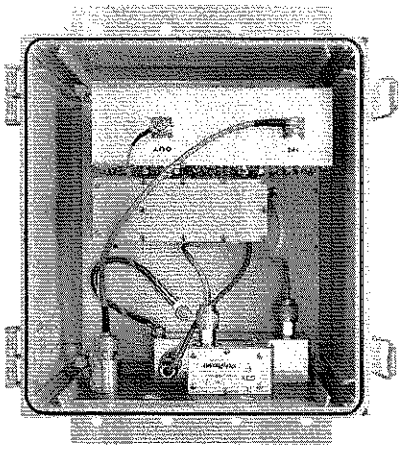
Design Components

Tower Top Amplifier (DS428B83H01T) - The Tower Top Amplifier (TTA) uses a quad-amplifier design to overcome the losses of a long transmission line. A pair of quad-amplifiers (A and B) are used in the tower box to provide redundancy. The 428B Tower Top Amplifier box *(Figure 1)* is constructed of a polyester material to reduce weight while maintaining environmental integrity. A preselector is included in the tower top box with a 32 MHz bandwidth (792 to 824 MHz).





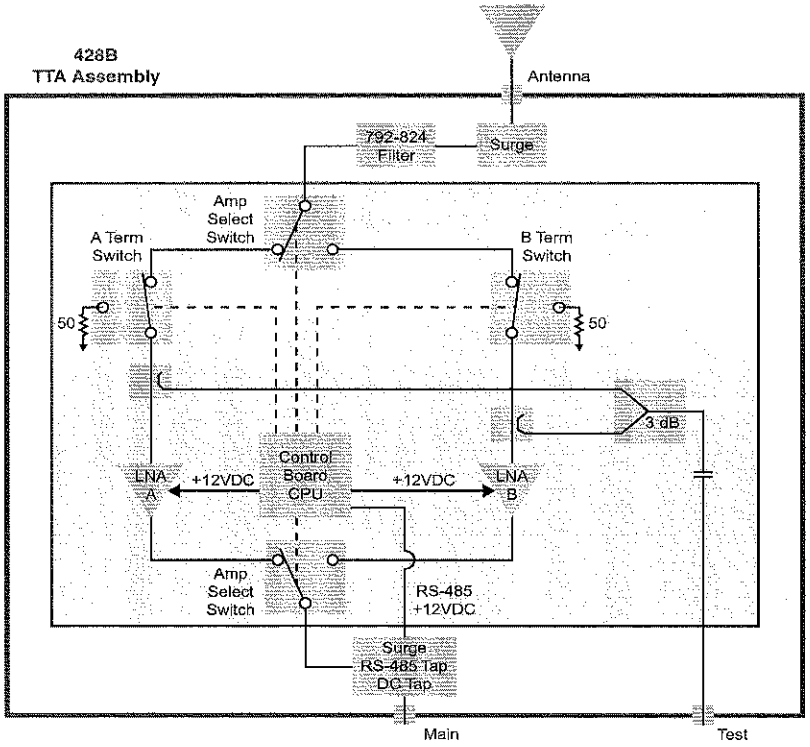


Figure 1: ***Picture and block diagram of the 428B TTA.***

Multicoupler Control Unit (DS428B83H01M) - The Multicoupler Control Unit (MCU) provides additional amplification to overcome the distribution loss of the multicoupler (see *Figure 2 and 3*). The multicoupler has the ability to distribute to 16 receivers and can be expanded to 32 with an additional shelf. The unit has adjustable attenuators for both reserve gain and distribution. Each amplifier assembly within the system is monitored to provide alarm indications. Form-C relay outputs are provided to interface to supervisory alarm systems. The standard unit is designed for 120 VAC operation but by adding 48 to the end of the part number **(DS428B83H01M48)** the unit will be designed for -48 VDC operation.

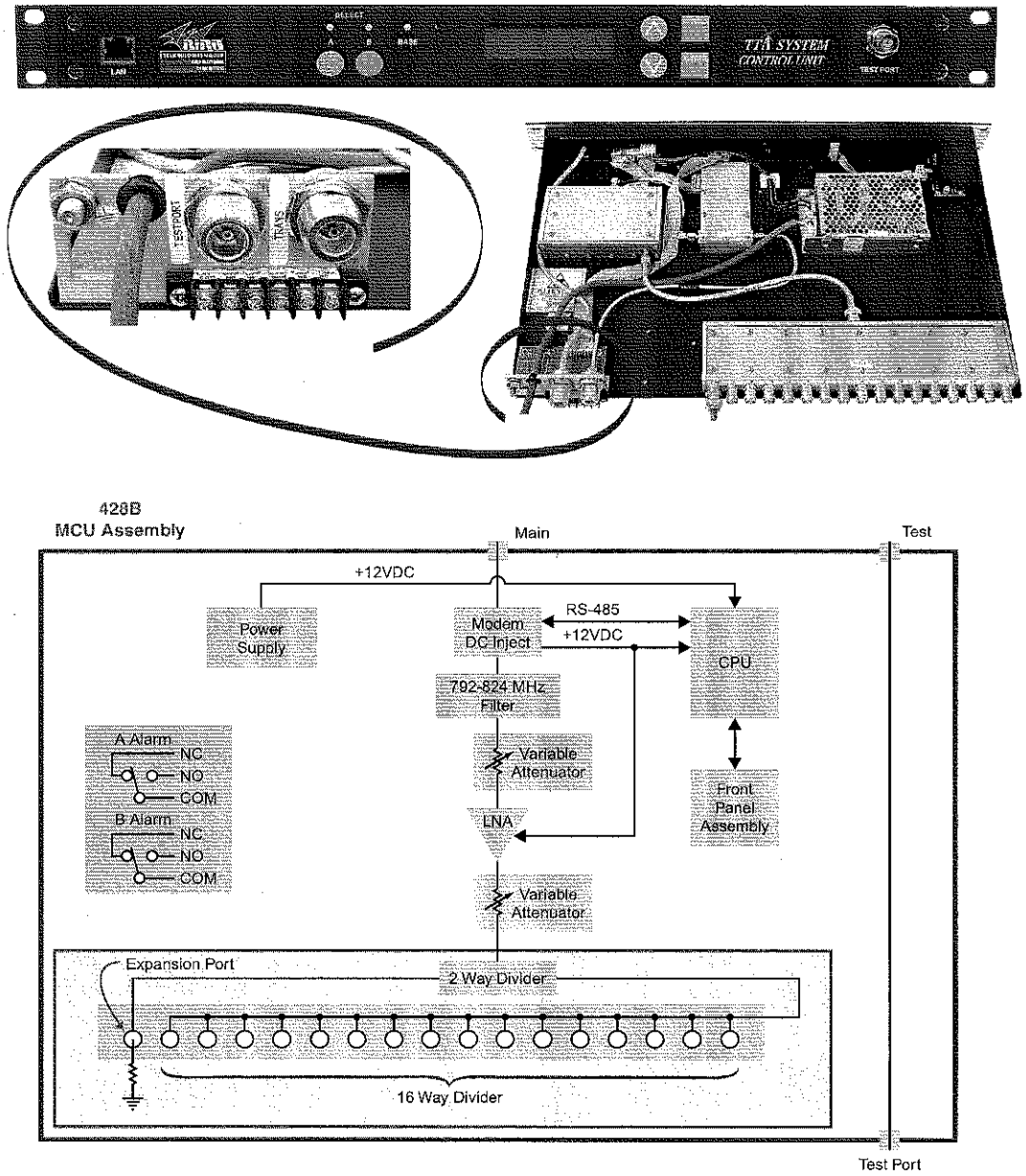
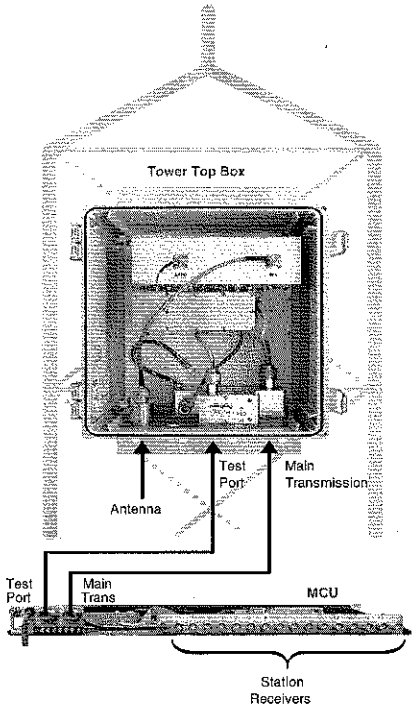


Figure 2: ***MCU Picture and Block Diagram.***



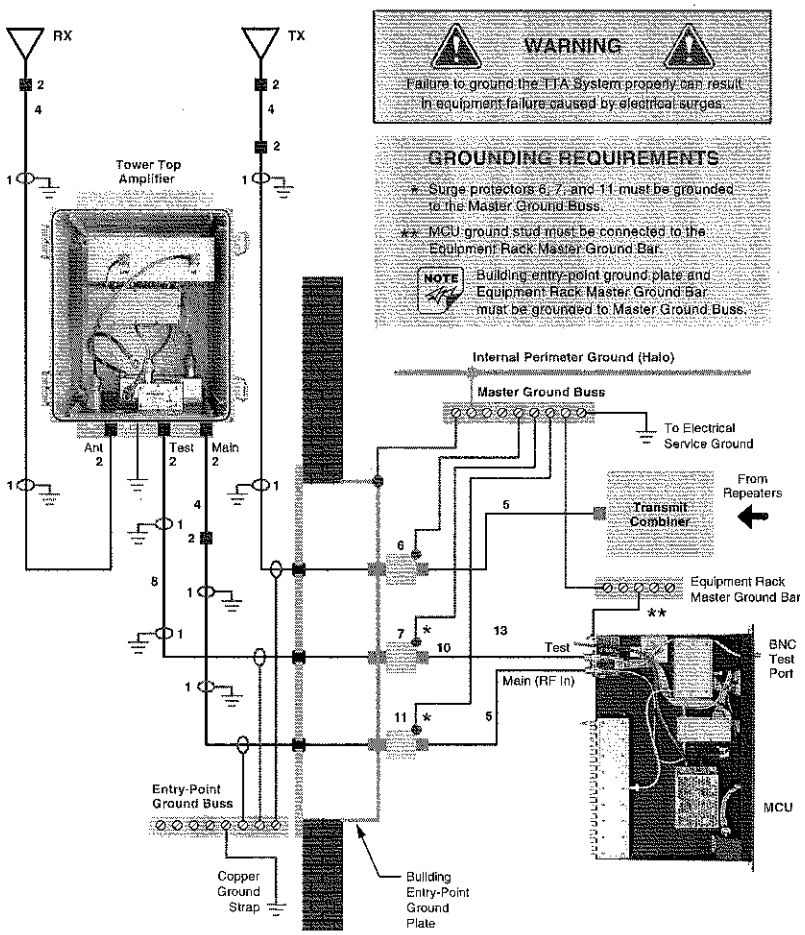
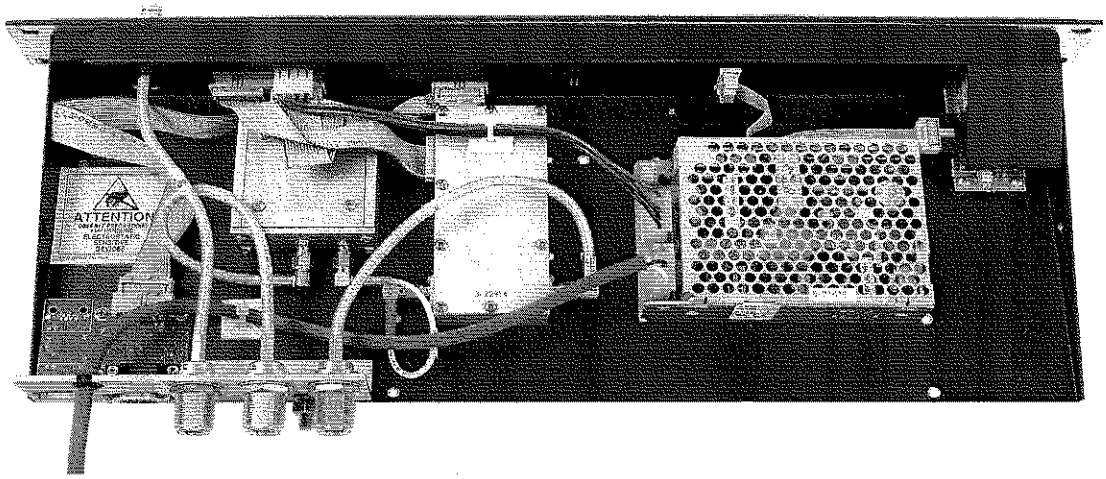


Figure 3: ***Physical and Electrical Installation of MCU.***

Control Management Unit (DS428B83H01C) - The Control Management Unit (CMU) interfaces the TTA to the ESS GTR8000 radio system. The CMU provides a single RF output for interface to the ESS. There are no receive ports or expansion ports provided since receive distribution is included in the ESS. The unit has an adjustable attenuator for reserve gain settings. Each amplifier assembly within the system is monitored to provide alarm indications. Form-C relay outputs are provided to interface to supervisory alarm systems. The standard unit is designed for 120 VAC operation but by adding 48 to the end of the part number **(DS428B83H01C48)** the unit will be designed for -48 VDC operation.



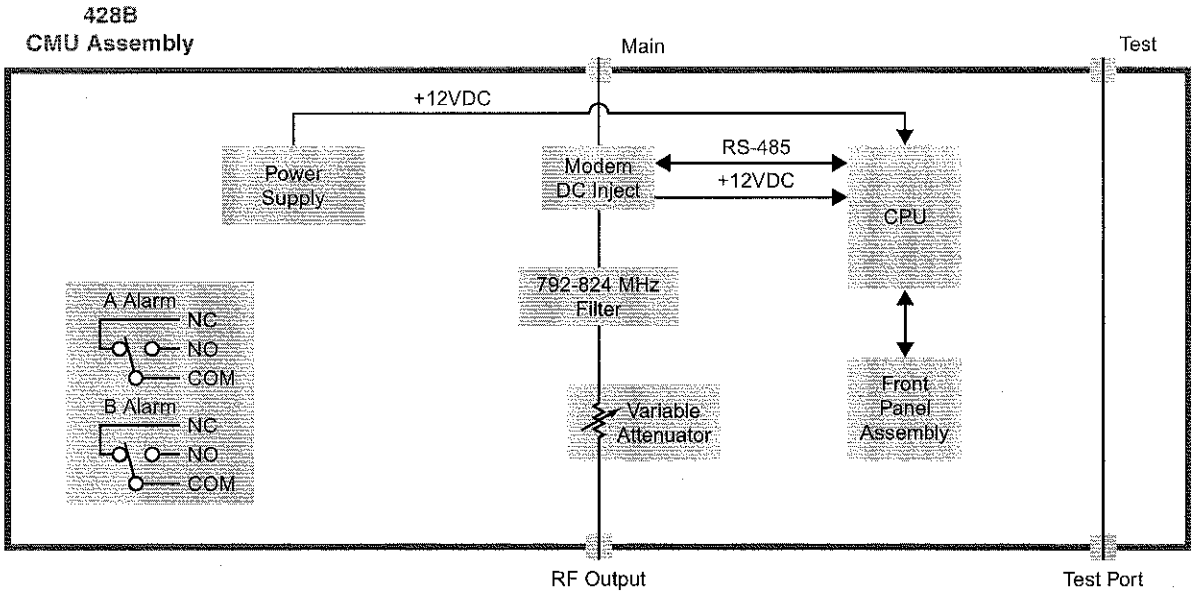
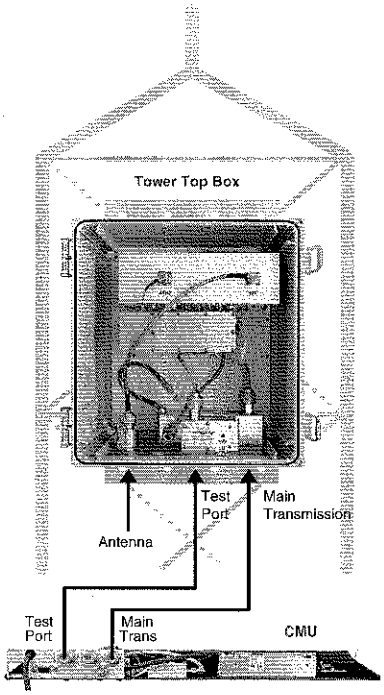


Figure 4: ***CMU Picture and Block Diagram.***



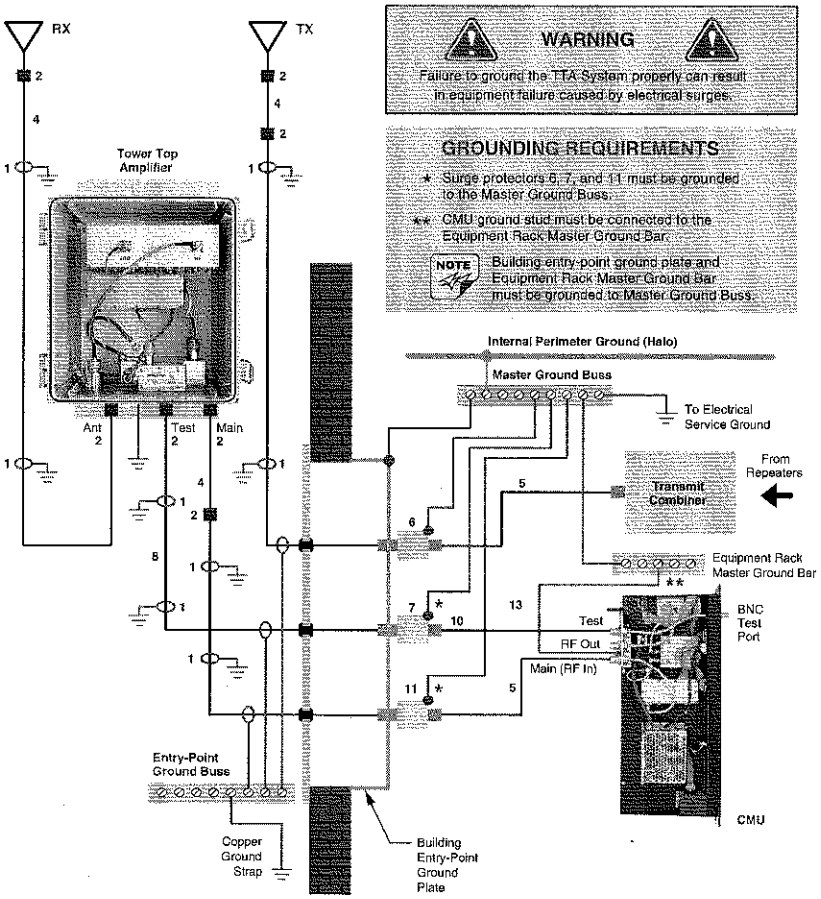


Figure 5: ***Physical and Electrical Installation of CMU.***

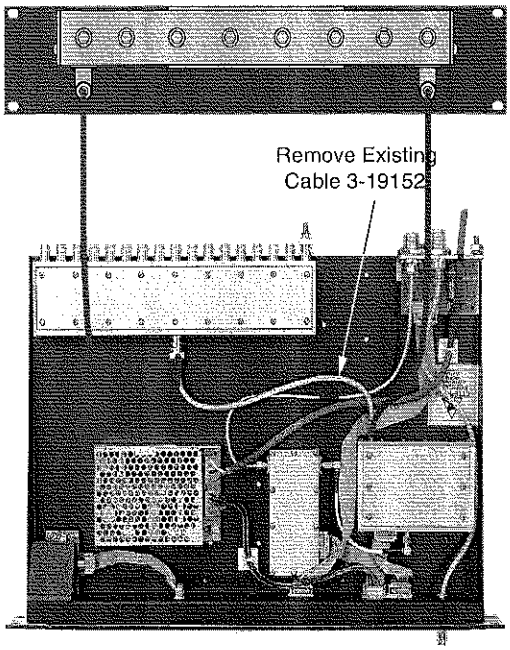


Figure 6: ***Optional Narrowband Filter.***

Optional Narrowband Filter - The narrowband filter is designed to help limit the bandwidth of the MCU style system. The filter is not used in CMU style systems. The option is shipped from the factory as shown in ***Figure 6*** ready to be interconnected to the MCU deck. It is recommended that the optional filter be mounted in the same rack just above the MCU deck. There are a total of 9 different narrowband filters available as shown in the table below.

Optional Filter Model #	Operating Range (MHz)	Band-width (MHz)
89-83F-02-03	792 to 806	3
89-83F-02-06	792 to 806	6
89-83F-02-09	792 to 806	9
89-83F-02-14	792 to 806	14
89-86A-02-03	806 to 824	3
89-86A-02-05	806 to 824	5
89-86A-02-10	806 to 824	10
89-86A-02-15	806 to 824	15
89-86A-02-18	806 to 824	18

Optional Narrowband Filters.

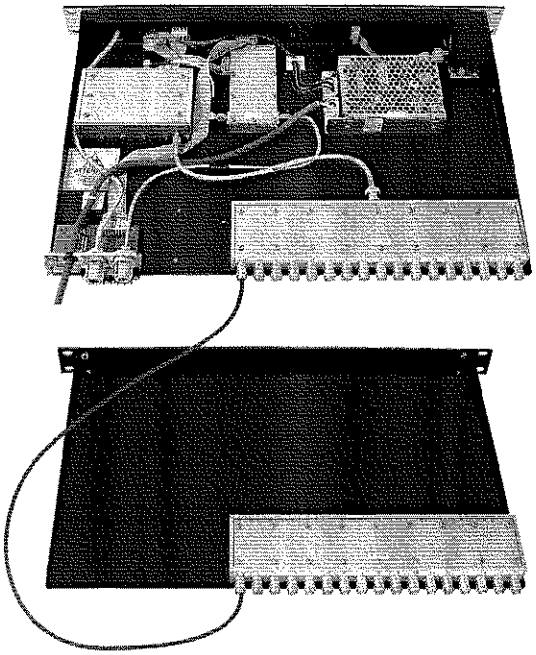
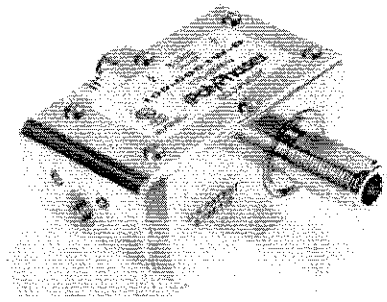


Figure 7: ***Optional Expansion Deck.***

MCU Expansion Deck (75-83H-428B) - The multicoupler expansion deck will increase the total multicoupler outputs of the MCU style system to 32. The expansion deck is not used with the CMU style system. The optional deck is shipped with the required interconnect cables (as shown in ***Figure 7***) and is designed to be installed in the same rack but below the MCU deck.

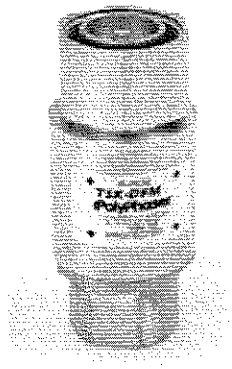
Design Considerations

Surge Protectors – The 428B TTA system utilizes standard receive DC Pass surge protectors. ***These surge protectors must be provided by the engineer.*** The recommended surge arrestors *(see Figure 8)* from PolyPhaser are shown in Figure 3 and Figure 5 above and designated as item 6, 7, and 11. Torquing specification obtained with proper Torque Wrenches is required to properly tighten all connectors. See Torquing Initiative document for more information. The 109 is an optimized arrestor with improved performance. The TSX protector is not only an optimized protector but also complies with our 150 dBc PIM and 25kW PIP requirements. All transmit protectors will utilize 7-16 DIN connectors. The DSXL provides DC blocking and is only used in special cases where a 428 style tower top box is connected to a 428B style base deck. The use of this polyphaser is described on page 14.



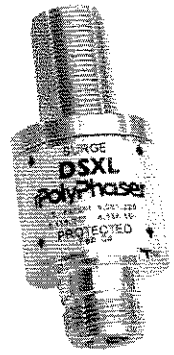
DS1090501WA (N male to antenna)
(N female to equipment)
DS1090501WB (N female to antenna)
(N female to equipment)

Receive Cable and Test Port Protector



DSTSXDFMBF (DIN female / male)
DSTSXDFFBF (DIN female / female)

Transmit Protector



DSDSXL (N female to antenna)
(N female to equipment)
DSDSXLMA (N male to antenna)
(N female to equipment)
DSDSXLME (N female to antenna)
(N male to equipment)

DC Block for Test Line
Special Cases Only (see page 14)

Figure 8: ***PolyPhaser Surge Arrester Part Number and Picture.***

Test Cable – The test cable connects the Control Unit with the TTA. This allows the TTA to be tested from the bottom of the tower but emulates a signal at the input to the TTA. The Test Cable should be constructed with LDF4 or equivalent ½" Heliax. Superflex cable is never recommended for outside use. A surge protector must be installed at the exit to the building.

Testing and Alignment – Testing the TTA system involves following the 5-Step procedure. The Reserve gain is adjusted according to the procedure. In the case of the MCU style system the Distribution gain is also adjusted.

Standalone or interface to other radios – The MCU was designed to allow individual radios to be connected to the TTA system. The ESS can also be utilized to interface external receivers and allow radio expansion outside the ESS.

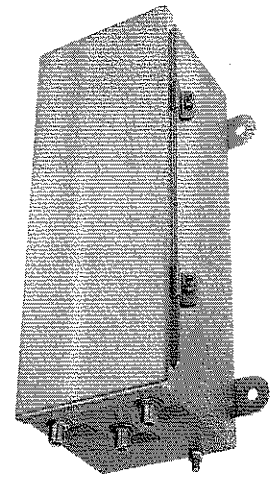
Compatibility Between 428 and 428B TTA System Components

GENERAL DISCUSSION

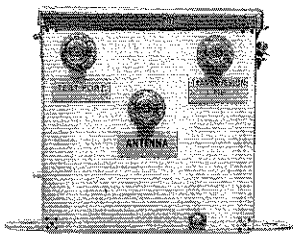
The purpose of these instructions is to serve as a guide to the inter-compatibility of the 428 and 428B Series TTA systems. The 428B Series TTA system was designed as an upgraded replacement for the original 428 Series. And the 428B components are backward compatible with 428 systems. Although the new 428B Series is a functional replacement for the original 428 Series there are design differences and improvements which you should be aware of. The major changes of the 428B Series include;

- The serial communications between the base deck and tower box are coupled to/from the main transmission line on the deck itself by a modem assembly. In the older 428 Series the data communications coupling took place at the main transmission lines building entry-point lightning arrester. The 428 system also required a double-shielded data cable running between the lightning arrester and the deck.

- The 428B Series uses a lighter weight polyester tower box which has a different mounting footprint. The footprint for both styles of tower box are shown later in this document.

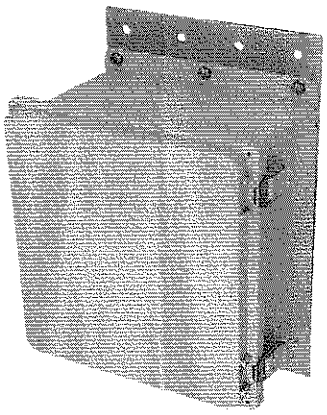


Front view

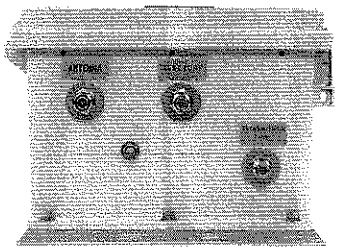


Bottom view

Figure 9: ***428 style tower box.***



Front view



Bottom view

Figure 10: ***428B style tower box.***

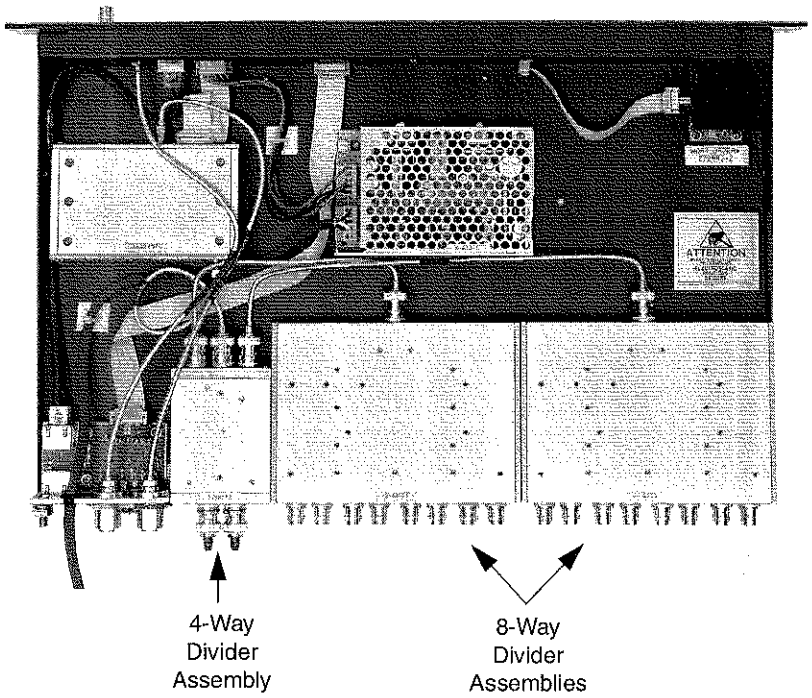


Figure 11: ***Top down view of the 428 MCU deck.***

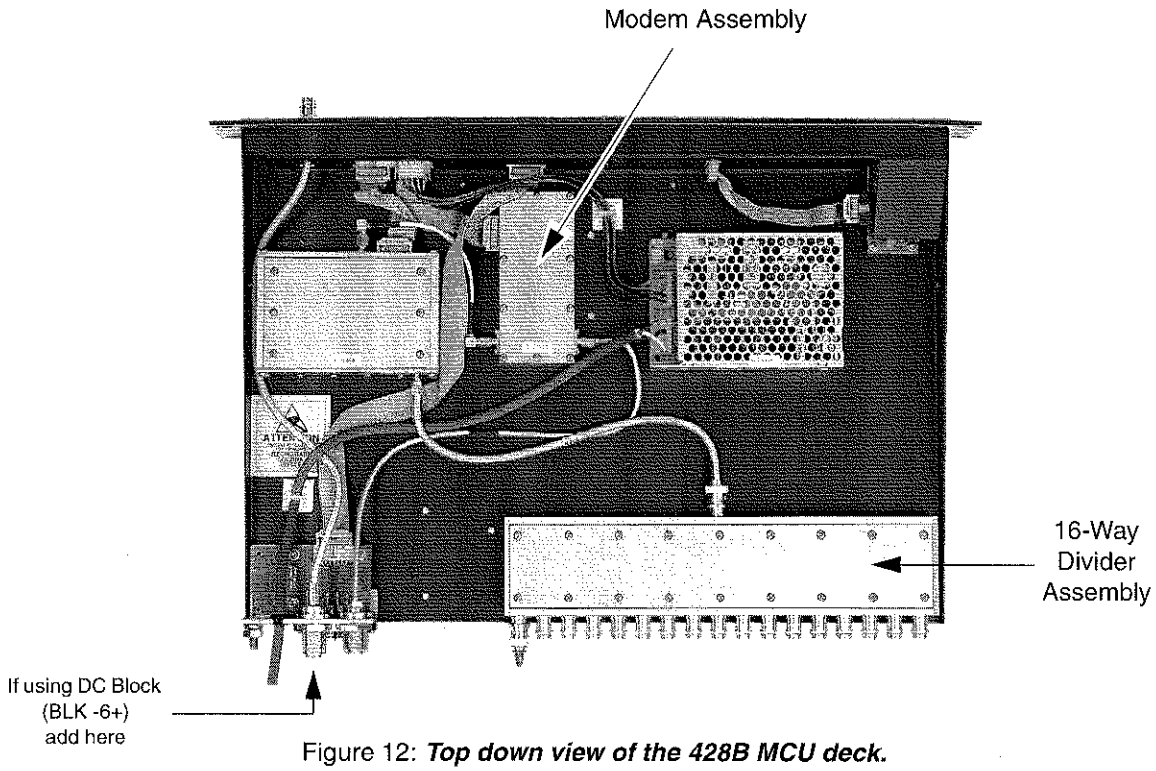


Figure 12: ***Top down view of the 428B MCU deck.***

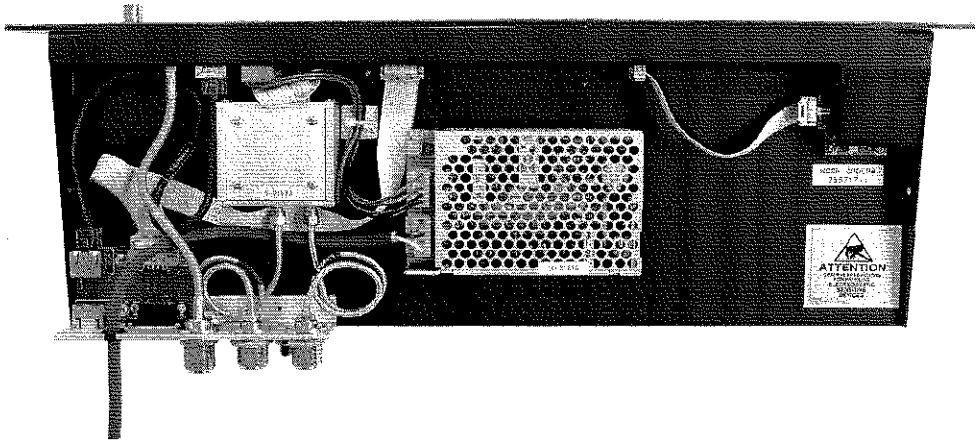


Figure 13: ***Top down view of the 428 CMU deck.***

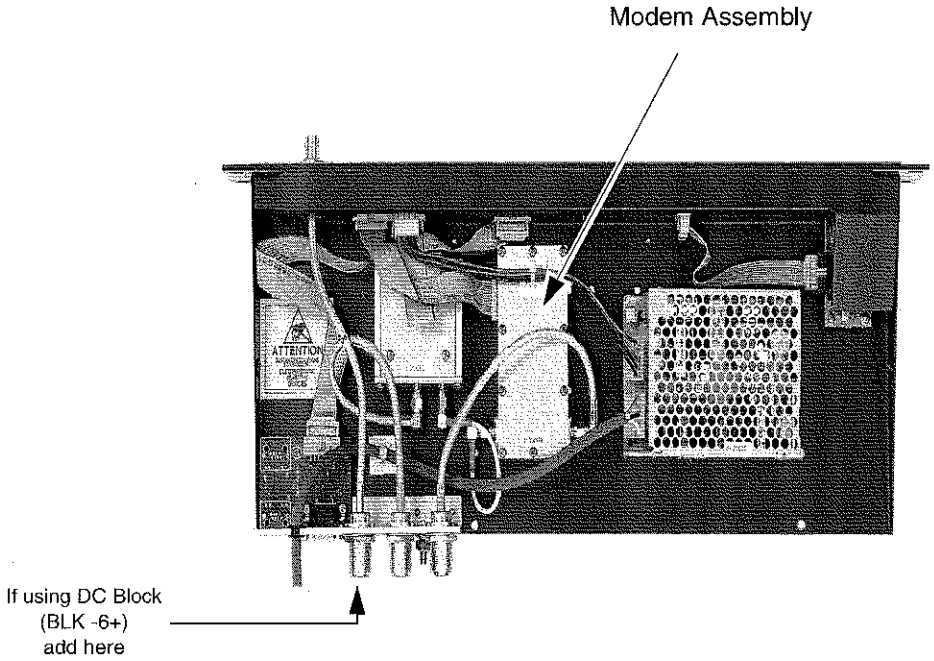


Figure 14: ***Top down view of the 428B CMU deck.***

- The test line coupling loss has been reduced in the 428B Series down to 33.5 dB. This needs to be taken into consideration when performing sensitivity tests as outlined in the installation and operation manual for your system.

- 428 series expansion decks (part# DDX1002A) need to be modified with a conversion kit when connecting them to a 428B deck.

Identifying Your Tower Box
It's easy to identify whether you have the 428 or 428B tower box by a simple examination of the box. The 428 system uses a tall stainless steel box (see **Figure 9**) while the 428B uses a rectangular polyester box as shown in **Figure 10.**

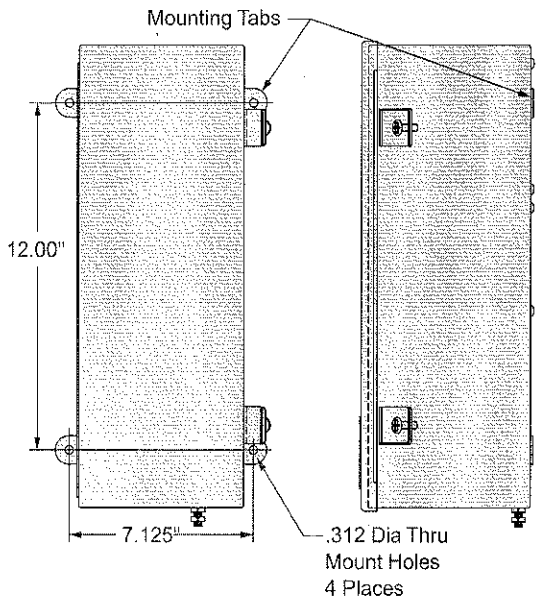
Identifying Your Base Deck
Base decks for both the 428 and 428B systems are available in two styles; either an MCU style or a CMU style. The difference between the MCU and CMU style is that the MCU style incorporates a receiver multicoupler on the deck and the CMU version does not.

The front panels of both the 428 and 428B look very similar so in order to tell the difference you will need to look at the deck from a top down angle. **Figure 11** shows the 428 MCU deck and **Figure 12** shows the 428B MCU deck. The 428B MCU deck will have a modem assembly and a 16-way divider. The 428 MCU deck will not have a modem assembly and instead of a 16-way divider it will have a pair of 8-way dividers along with a 4-way divider.

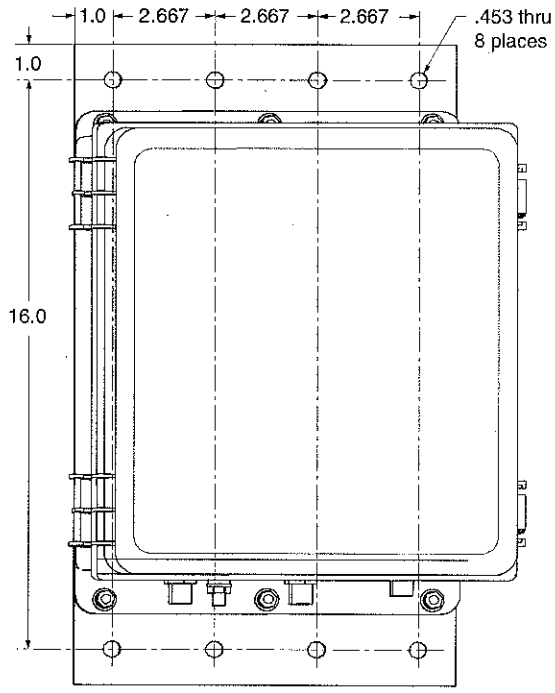
Figure 13 shows the 428 CMU deck and **Figure 14** shows the 428B CMU deck. The 428B CMU deck will have a modem assembly and the 428 CMU deck will not. Notice that neither of the CMU style decks have any receiver multicoupler subassemblies and therefore the decks are physically smaller than the MCU style decks.

INTERCHANGEABILITY

Although there are some physical differences between the 428B and 428 Series TTA systems they are functionally compatible. This compatibility allows the tower box and deck from the two systems to be interchanged. The instructions listed below will discuss in detail the interchangeability of the decks and tower boxes.



428 style box



428B style box

Figure 15: ***Tower top box mechanical details.***

Tower Top Boxes
The tower top boxes are the easiest components of your TTA system to interchange. You simply need to move the three RF cables from your existing box and re-connect them to similarly labeled connectors on the new box. Keep in mind that there are considerable differences in the mounting hole dimensions between the 428 and 428B series tower boxes. Refer to **Figure 15** which shows the mechanical details of each box style and **Figure 16** which shows the main transmission line connections of both 428 and 428B series systems.

428B Deck connected to a 428 Tower Box
When connecting a 428B deck to a 428 tower box the following notes apply;

- There is no need to use the specialized polyphaser/modem (TXRX part number 8-21550). Also, there is no need to use the data protectors (Polyphaser part # NX3-05) or the data cable that runs between the polyphaser and the deck.

- The customer must supply and install a serial pass and DC pass polyphaser at the main transmission line building-entry point. Use Motorola part number DS1090501W-A (Male/Female) or part number DS1090501W-B (Female/Female).

- The 428 tower box places a DC voltage on the test transmission line. On the 428B deck the front panel test connector is straight-through connected to the rear panel test connector. So when a 428B deck is connected to a 428 tower top box the test line DC voltage will now be present on the decks front panel BNC test connector. To block this DC voltage you can install a DC Block on the decks rear panel test connector or you can change the building entry-point surge suppressor to a DC blocking type. If you use a DC Block on the rear of the deck use Mini-Circuits part number "BLK-6+" (see figures 12 or 14). If you use a DC blocking type surge arrester at the building entry-point use Motorola part number "DSDSXL" (female/female) or "DSDSXLMA" (male/female).

428 Deck connected to a 428B Tower Box
When connecting a 428 deck to a 428B tower box the following notes apply;

- The 428B tower box does not place a DC voltage on the test transmission line. The 428 deck will

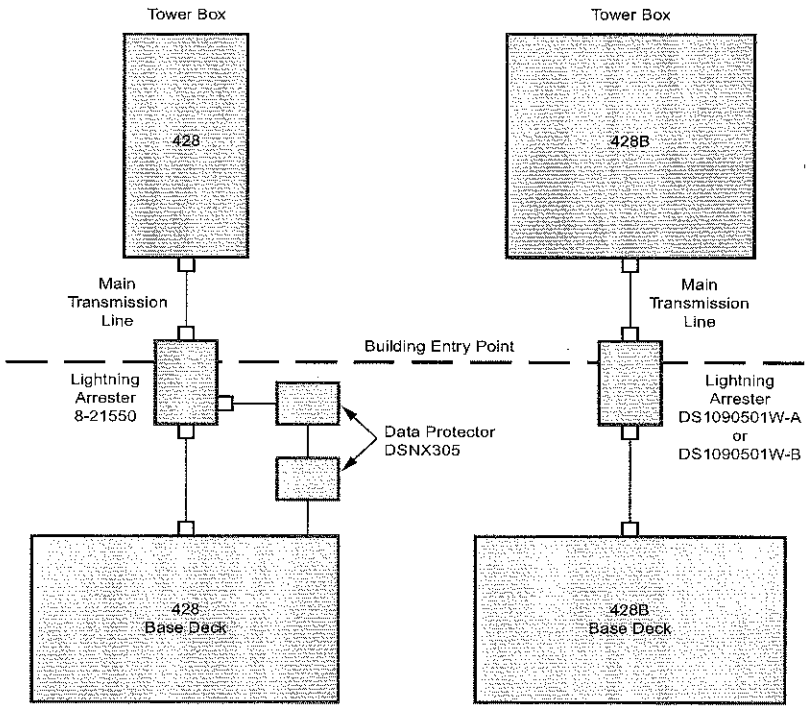


Figure 16: Main Transmission Line connections of the 428 and 428B series systems.

interpret this as a fault and will display a "test cable not connected" message on the LCD display.

NOTE

If you have an older version of firmware in your 428 deck you will also see the front panel BASE LED turn red. You should update your 428 deck firmware to version 1.72 or later. This software upgrade will eliminate the "test cable not connected" message and the red LED.

428 EXPANSION DECK CONVERSION

The DDX1002A is an expansion deck designed to expand the number of RF output ports on the **428 series** TTA deck (see **Figure 17**). These instructions describe the installation of a conversion kit for the DDX1002A expansion deck. The purpose of the conversion is to allow the DDX1002A to be used as an expansion deck for the model **428B series** TTA deck.

The kit (TXRX part # 75-90-428) contains all the necessary parts as listed below.

Kit Contents

(2) 4-40 x 1/4" screws (TXRX part # 8-6003)
(1) BNC-BNC cable (TXRX part # 3-14536)
(1) 2-way Power Divider (TXRX part # 3-17107)

Installation Procedure

The installation procedure is very straight forward and consists of mounting a 2-way divider on the deck and connecting cables between the sub-assemblies. Follow the procedure below in a step-by step fashion to complete the conversion.

1) Place the supplied 2-way divider on the deck in between the existing 8-way dividers with the BNC connectors facing inwards towards the deck (see **Figure 18**).

2) While holding the 2-way divider in place stand the deck up on its edge and install two 4-40 screws in the mounting holes shown in **Figure 19**.

3) Lay the deck down flat and install the three cables to the individual dividers as shown in **Figure 20**.

4) The free end of the cable attached to the center connector on the 2-way divider will be used to connect to the expansion port on the 428B control unit deck.

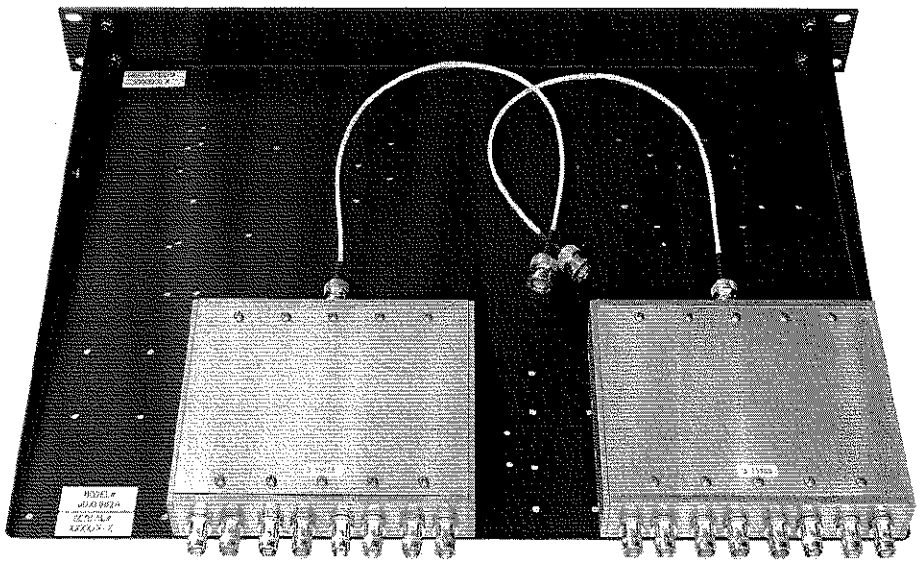


Figure 17: The DDX1002A Expansion Deck.

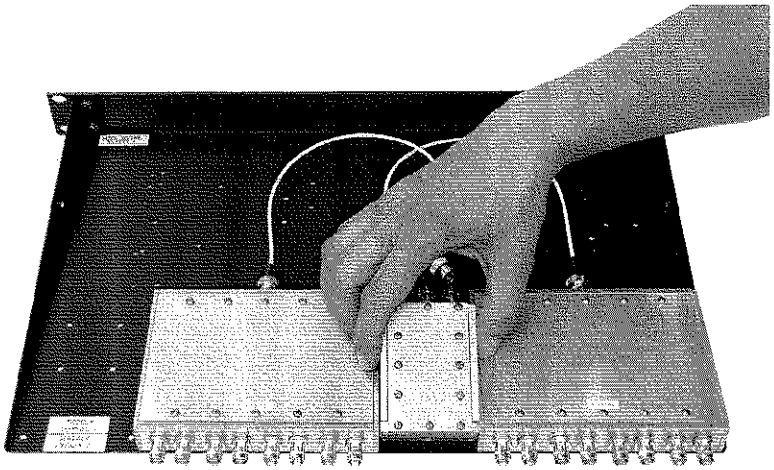


Figure 18: Placing the 2-way divider.

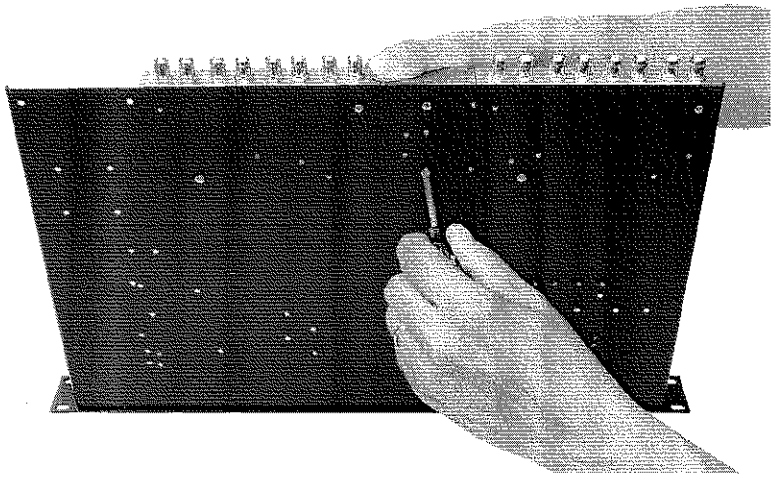


Figure 19: Install the 2-way mounting screws.

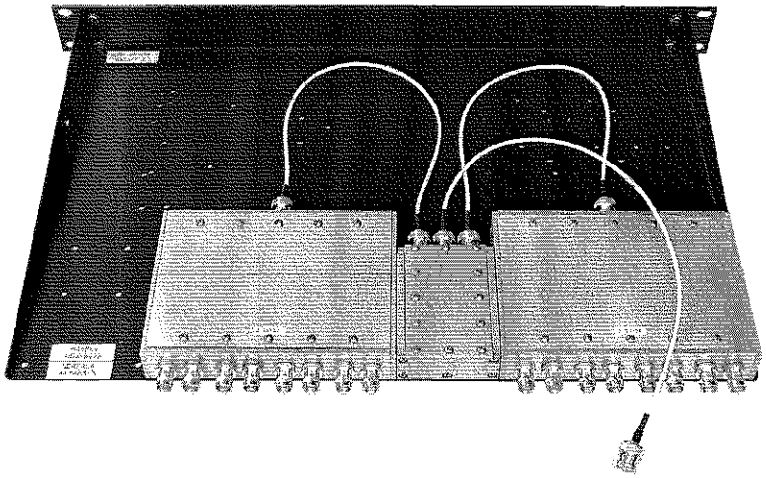


Figure 20: DDX1002A Expansion Deck with conversion kit installed.

Frequently Asked Questions (FAQ)

Q – Can the ESS supply distribution to other radios outside the ESS cabinet?

A – Yes. The signal is taken from one of the unused ports on the Site RMC and distributed to other radios. Careful adjustment of gain must be considered and balanced sensitivity must be verified after installation. Distribution power splitting must be done with separate Power splitting.

Q – Can an ESS cabinet be fed from an MCU?

A – Yes. When the ESS is connected to the MCU there must be an additional 3 dB attenuator installed between the MCU and ESS to balance the extra amplification in the ESS.

Q – Should the unused ports on the MCU be terminated?

A – No. Internal splitters maintain isolation without the need for external termination. However, unused expansion ports must be externally terminated.

Q – Can the 428B TTA, MCU, or CMU be ordered and used on a 428 TTA receive system?

A – Yes. Review the compatibility section of this guide for changes and modifications that are required.

Q – Is the PolyPhaser for the main receive line the same as the one used on the current 428 TTA?

A – No. The PolyPhaser surge protector used in the 428 contains a data modem to combine telemetry data on the RF line. The new TTA does not require a separate data line because the data is applied directly to the RF cable.

Q – Is the Surge Protector used on the receive line included with the TTA?

A – No. The new TTA combines the data within the Control Unit and does not require a data modem. For this reason the responsibility of supplying the surge protector falls on Motorola. The engineer must include the receive line surge protector in their design.

Background Material and other resources

428B Design Guide

http://compass.mot.com/doc/351239875/Design_Guide_of_428B_TTA_System_version_1.0.pdf
Design Guide for the 428B Family of receive amplifier components. This guide is aimed at answering most questions during the design phase.

428B TTA marketing sheet

http://compass.mot.com/doc/351239876/428B_Marketing_Sheet_4142010_.pdf
BTG (TxRx) marketing sheet containing the detailed technical specifications on the 428B.

428B TTA Manual

http://compass.mot.com/doc/351239874/428B_Manual_7-9487.pdf
BTG (TxRx) manual detailing all of the information required to install, optimize, and troubleshoot the 428B TTA.

5 Step Program for Receiver Multicoupler verification

http://compass.mot.com/doc/351187695/Five_Step_Program_v7_0.pdf
This document describes the test procedure for testing, aligning, and troubleshooting TTA systems. This document should be used for every TTA acceptance test plan.

For more information or for additional assistance please contact:

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TXRX Systems Contact

Chapter 306 of the Acts of 2004
An Act Relative to the Health and Safety on Construction Projects

GENERAL CONTRACTOR'S CERTIFICATION - BID FORM

_____ (Name of General Bidder) hereby certifies that it, and all its subcontractors who are not filed subbidders shall:

(1) who shall certify that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is a least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

Signed under the penalties of perjury. _____(date)

_____
Signature of authorized representative of contractor

_____
Print name of authorized representative of contractor

RETURN THIS FORM WITH YOUR BID